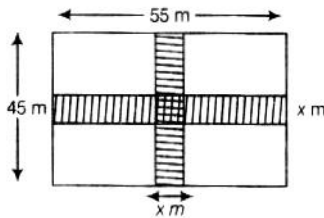


# Solutions Mensuration SET-1

1. (c) Given, length = 55m  
Breadth = 45m



$$\begin{aligned} \text{Area of lawn} &= 1911 \text{ m}^2 \\ \text{Area of rectangular plot} &= 45 \times 55 = 2475 \text{ m}^2 \\ \text{Area of crossroads} &= 2475 - 1911 = 564 \text{ m}^2 \end{aligned}$$

Let the width of each crossroad =  $x$  m

$$\begin{aligned} \therefore 45x + 55x - x^2 &= 564 \\ x^2 - 100x + 564 &= 0 \\ x^2 - 94x + 6x + 564 &= 0 \\ x(x - 94) - 6(x - 94) &= 0 \\ (x - 6)(x - 94) &= 0 \\ x &= 6, 94 \\ [\because 94 \text{ is discarded}] \\ \therefore x &= 6 \text{ m} \end{aligned}$$

$\therefore$  Width of each of the crossroads = 6 m

2. (a) Let the side of square be  $x$  m.  
So, length of rectangle is  $(x + 8)$  m  
and breadth of rectangle is  $(x - 6)$  m.  
According to the question,

$$\begin{aligned} \text{Area of square} &= \text{Area of rectangle.} \\ \Rightarrow x \times x &= (x + 8)(x - 6) \\ \Rightarrow x^2 &= x^2 + 8x - 6x - 48 \\ \Rightarrow x^2 &= x^2 + 2x - 48 \\ \Rightarrow 2x &= 48 \\ \Rightarrow x &= 24 \text{ m} \end{aligned}$$

$\therefore$  Length of the rectangle =  $24 + 8 = 32$  m

Breadth of the rectangle =  $24 - 6 = 18$  m

$$\begin{aligned} \therefore \text{Perimeter of the rectangle} &= 2(l + b) \\ &= 2(32 + 18) \\ &= 2(50) \text{ m} \\ &= 100 \end{aligned}$$

3. (e) Let the base of the right angled triangle be  $4x$  and its height be  $5x$ .

Then, area of the right angled triangle

$$\begin{aligned} &= \frac{1}{2} \times 4x \times 5x \\ \Rightarrow 80 &= \frac{1}{2} \times 20x^2 \\ \Rightarrow x^2 &= 8 \\ \Rightarrow x &= 2\sqrt{2} \text{ cm} \\ \text{Height} &= 5x \\ &= 5 \times 2\sqrt{2} \\ &= 10\sqrt{2} \text{ cm} \end{aligned}$$

4. (a) In  $\triangle BDE$ ,  
 $DE = 28 + 28 = 56$  cm  
 $BC = 28$  cm  
 $\text{Area of } \triangle BDE = \frac{1}{2} \times DE \times BC$   
 $= \frac{1}{2} \times 56 \times 28$   
 $= 784 \text{ cm}^2$

5. (b) Area of square =  $28 \times 28 = 784 \text{ cm}^2$   
Area of four circles =  $4\pi r^2$   
 $= 4 \times \frac{22}{7} \times 7 \times 7$   
 $= 616 \text{ cm}^2$   
 $\therefore$  Area of shaded region =  $784 - 616$   
 $= 168 \text{ cm}^2$

6. (c) Area of circle =  $7 \times \text{Circumference}$   
 $\pi R^2 = 7 \times 2\pi R$   
 $\therefore R = 14$   
 $\therefore$  Circumference of circle =  $2\pi R$   
 $= 2 \times \frac{22}{7} \times 14 = 88$  units

7. (c) The number of tiles will be minimum, if size of each marble is maximum.  
Size of each tile = HCF of 3.78 and 5.25m  
378)525(1

$$\begin{array}{r} \underline{378} \\ 147)378(2 \\ \underline{294} \\ 84)147(1 \\ \underline{84} \\ 63)84(1 \\ \underline{63} \\ 21)63(3 \\ \underline{63} \\ \times \end{array}$$

$\therefore$  HCF of 3.78 and 5.25 m = 0.21 m

$$\therefore \text{Number of tiles} = \frac{3.78 \times 5.25}{0.21 \times 0.21} = 450$$

8. (b) Distance covered in 1 revolution  
 $= \pi \times \text{diameter} = \pi d$   
 $\therefore 1000 \times \frac{22}{7} \times d = 440$   
 $\Rightarrow d = \frac{440 \times 7}{1000 \times 22} = 0.14$  m

9. (c) Let the length of the rectangle be  $x$  m  
and breadth be  $y$  m.  
According to the question,  
**Case I**  $xy - (x - 5)(y + 3) = 9$   
 $\Rightarrow xy - (xy - 5y + 3x - 15) = 9$   
 $\Rightarrow 5y - 3x + 15 = 9$   
 $\Rightarrow 3x - 5y - 6 = 0 \dots (i)$   
**Case II**  $(x + 3)(y + 2) - xy = 67$   
 $\Rightarrow 3y + 2x + 6 = 67$   
 $\Rightarrow 2x + 3y - 61 = 0 \dots (ii)$

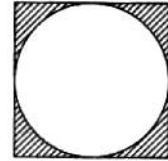
$$\begin{aligned} \text{By Eqs. (i) } \times 3 + \text{(ii) } \times 5, \\ 9x - 15y - 18 &= 0 \end{aligned}$$

$$\begin{aligned} \underline{10x + 15y - 305} &= 0 \\ 19x &= 323 \\ \Rightarrow x &= \frac{323}{19} = 17 \text{ m} \end{aligned}$$

$\therefore$  Length of the rectangle = 17 m

10. (e) Let the length of rectangle =  $l$  m  
and breadth of rectangle =  $b$  m  
Area of the original rectangle =  $lb$   
According to the question,  
 $l \times \frac{120}{100} \times b \times \frac{80}{100} = 192$   
 $\Rightarrow 1.2l \times 0.8b = 192$   
 $\Rightarrow lb = \frac{192}{1.2 \times 0.8}$   
 $\Rightarrow lb = 200 \text{ m}^2$   
 $\therefore$  Area of the original rectangle = 200 m<sup>2</sup>

11. (d)



Radius of the circular garden

$$= \frac{28}{2} = 14 \text{ m}$$

Area of the circle =  $\pi r^2$

$$= \frac{22}{7} \times 14 \times 14 = 616 \text{ m}^2$$

Area of the square plot =  $28 \times 28 = 784 \text{ m}^2$

$$\therefore \text{Area of the shaded region} = (784 - 616) \text{ m}^2 = 168 \text{ m}^2$$

12. (c) Side of a square =  $\frac{\text{Perimeter}}{4}$

$$= \frac{56}{4} = 14 \text{ cm}$$

$\therefore$  Smallest side of the right angled triangle =  $14 - 8 = 6$  cm

Length of rectangle

$$= \frac{\text{Area}}{\text{Breadth}} = \frac{96}{8} = 12 \text{ cm}$$

$\therefore$  Second side of the triangle =  $12 - 4 = 8$  cm

13. (b) Radius of circle =  $\frac{28}{2} = 14$  cm

Area of circle =  $\pi r^2$

$$= \frac{22}{7} \times 14 \times 14 = 616 \text{ cm}^2$$

$\therefore$  Area of rectangle =  $1166 - 616 = 550 \text{ cm}^2$

Breadth of rectangle

$$= \frac{550}{25} = 22 \text{ cm}$$

$$\begin{aligned} \therefore \text{Circumference of circle} &= \pi \times \text{diameter} \\ &= \frac{22}{7} \times 28 = 88 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{Perimeter of rectangle} &= 2(\text{length} + \text{breadth}) \\ &= 2(25 + 22) = 94 \text{ cm} \end{aligned}$$

$$\therefore \text{Required sum} = (88 + 94) \text{ cm} = 182 \text{ cm}$$

14. (a) For a right angled triangle,  
 hypotenuse =  $\sqrt{6^2 + 8^2} = \sqrt{36 + 64}$   
 $= \sqrt{100} = 10 \text{ cm}$   
 Largest side = 10 cm  
 Side of square =  $3 \times 10 = 30 \text{ cm}$   
 $\therefore$  Diagonal of square =  $\sqrt{2} \times 30$   
 $= 30\sqrt{2} \text{ cm}$

15. (b) Perimeter of rectangle = 668 cm  
 $\therefore 2(l + b) = 668$   
 $\Rightarrow l + b = 334$   
 $\Rightarrow l = (334 - b)$   
 Length of a rectangle  
 $=$  Twice the diameter of a circle  
 $334 - b = 2 \times d = 2 \times 2r = 4r$   
 $\therefore r = \frac{334 - b}{4}$   
 Area of square = Circumference of circle  
 $(22)^2 = 2\pi r$   
 $484 = \frac{2 \times 22(334 - b)}{7 \times 4}$   
 $\Rightarrow 334 - b = \frac{484 \times 7 \times 4}{2 \times 22} = 308$   
 $\Rightarrow b = 334 - 308 = 26 \text{ cm}$

16. (a) Perimeter of square  
 $= 2 \times$  Perimeter of rectangle  
 $= 2 \times 2(l + b) = 4(8 + 7) = 60$   
 Side of square =  $\frac{60}{4} = 15 \text{ cm}$   
 Diameter of semi-circle = 15 cm  
 $\therefore$  Circumference of semi-circle =  $\frac{\pi d}{2} + d$   
 $= \frac{22}{7 \times 2} \times 15 + 15 = 38.57 \text{ cm}$

Gupta Classes